

Work Order ID 66481

February 15, 2011 2:03:11 PM

Page 1

Item ID: D212-664-107

Revision ID:

Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11 Start Qty: 1.00

Required Date: 3/03/11 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: CL Date: 11/02/15 Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D212-664-147	Rev B								

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

11-2-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 66481



Page 2

February 15, 2011 2:03:11 PM

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11 Start Qty: 1.00



Cust Item ID:

Required Date: 3/03/11 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***

2-Position cuffs on tube ensure proper positioning

3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig
DT8548 and DT8549 as per QSI 10

4-Transfer drill rivet holes from cuff into tube.

5-Identify cuff position and Batch # on each.

6- Inspect surface damage

7- Deburr and realodine cuff.

SAD 11-03-02

11-3-2



W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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February 15, 2011 2:03:11 PM



Page 3

Item ID: D212-664-107

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Revision ID:

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Item Name: Crosstube Low Standard Fwd

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Required Date: 3/03/11 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion Memo	0.00 0.00							
160 QC Quality Control	QC3- Inspect Part Finish Memo	0.00 0.00							
170 QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00							

SAD
1102-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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February 15, 2011 2:03:11 PM

Page 4

Item ID: D212-664-107

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Setup Start

Revision ID:

Stop

Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11 Start Qty: 1.00

Cust Item ID:

Required Date: 3/03/11 Req'd Qty: 1.00

Customer:




Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  Outsource2	Outsource process - NDT per QSI038 4.1	0.00							
	Memo	0.00							<u>CL 11/03/04</u> ①
	Liquid Penetrant Inspection as per QSI 038 Or Issue P/O: <u>13609</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190  Packaging	Packaging	0.00							
	Memo	0.00							<u>11/03/04</u> ①
	Ensure copy of NDT results attached to work order.								P.T.O.
200  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							<u>ET 11-03-04</u>
	Inspect for damage & ensure results are as per Dwg D212-664-107								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-107 PAR #: _____ Fault Category: 2 lbs. NCR: Yes No DQA: _____ Date: 11/03/28

Resolution: Scrap Disposition: Scrap QA: N/C Closed: ✓ Date: 11/03/28

NCR: <u>66481</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>11.03.11</u>	<u>190</u>	<u>cross tube fell on floor</u> <u>when main boxes that</u> <u>were returned from the HAI show.</u> <u>R.C. Lack of Attention - Box was</u> <u>huge & no one was spotting in front</u> <u>of the crate.</u>	<u>CP</u> <u>11.03.14</u> <u>Q51042</u>	<u>Have re-NOT'D</u> <u>RE NOT ON TUBS</u>	<u>N/A</u> <u>see below</u>		<u>CP</u> <u>11.03.14</u> <u>Q51042</u>	<u>11/03-28</u>
<u>11.03.14</u>	<u>190</u>	<u>Polish tube in areas</u> <u>of scuff marks</u>	<u>CP</u> <u>11.03.14</u> <u>Q51042</u>		<u>CP</u> <u>11-3-14</u>	<u>N/A</u>	<u>CP</u> <u>11.03.14</u> <u>Q51042</u>	<u>11/03-28</u>
<u>11.03.18</u>	<u>190</u>	<u>SCRAP TUBE</u> <u>BASED ON ATTACHED</u> <u>EMAIL</u>	<u>CP</u> <u>11.03.18</u> <u>Q51042</u>		<u>CP</u> <u>11-3-21</u>	<u>8</u> <u>11/03/23</u>	<u>CP</u> <u>11.03.18</u> <u>Q51042</u>	<u>8</u> <u>11/03/28</u>

NOTE: Date & initial all entries

Work Order ID 66481

February 15, 2011 2:03:11 PM



Page 5

Item ID: D212-664-107

Accept



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Cust Item ID:

Required Date: 3/03/11 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff
A/R SIKAFLEX -241/-291 BATCH: _____

220

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: _____

Finish Time: _____

PAINT:

Start Time: _____

Finish Time: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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February 15, 2011 2:03:11 PM



Page 6

Item ID: D212-664-107

Accept



Setup Start



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Cust Item ID:

Required Date: 3/03/11 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

230

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

240

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with magnobond 6398 per dwg D212-664-147, cure for 12hrs before packaging.

Time & date of application: _____

Batch: _____

EXP. DATE _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Work Order ID 66481

February 15, 2011 2:03:11 PM



Page 8

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11 Start Qty: 1.00



Cust Item ID:

Required Date: 3/03/11 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							
	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-107								
280		0.00							
	QC21- Final Inspection - Work Order Release								
QC	Memo	0.00							
Quality Control									

mf
11-0323

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Page 1

February 15, 2011 2:03:10 PM

Work Order ID: 66481

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11

Required Date: 3/03/11

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D
 10.05.27 added pick kit DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN		Manufactured	No			140	Each	2.0000	1	1			
Crosstube Turning Detail													

Location	Loc Qty	Loc Code
LG	2	
58588	1	
58611	1	

Handwritten: 11-2-28

D3659-1s

Manufactured No

220	Each	5.0000	2	2
-----	------	--------	---	---

Location	Loc Qty	Loc Code
ST477	5	
60691	1	
62425	4	

CR3212-4-06

Purchased No

240	Each	1,156.000	44	44
-----	------	-----------	----	----

CHERRY RIVET

Location	Loc Qty	Loc Code
ST311	1156	
112492	156	
112724	200	
112794	800	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Picklist Print

February 15, 2011 2:03:10 PM

Work Order ID: 66481

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11

Required Date: 3/03/11

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

240

Each

68.3390

4

4



RUBBER CUSHION

Location

Loc Qty

Loc Code

LG

51.33897368

53775

5.97897368

58161

3.56

59580

0.12

61465

4.68

63960

10

65656

27

ST415

17

64171

16

64300

1

MS21920-25

Purchased No

240

Each

115.0000

4

4



Clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

91

113281

0

114759

5

114901

3

115278

1

115849

32

116264

50

ST451

24

113281

5

113282

18

113744

1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Work Order ID: 66481

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11

Required Date: 3/03/11

Start Qty: 1.00

Required Qty: 1.00

D2893-1 Manufactured No 240 Each 19.0000 2 2



2.75 Support

Location Loc Qty Loc Code

LG 19
63367 19

D3428-1 Manufactured No 260 Each 23.0000 1 1



Placard

Location Loc Qty Loc Code

ST053 12
66115 12
ST056 11
63978 11

AN6-35A Purchased No 260 Each 90.0000 4 4



BOLT

Location Loc Qty Loc Code

ST343 90
115742 40
116528 50

AN6-36A Purchased No 260 Each 68.0000 4 4



Bolt

Location Loc Qty Loc Code

ST343 68
115698 30
115835 18
116400 20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Page 4

February 15, 2011 2:03:10 PM

Work Order ID: 66481

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 2/15/11

Required Date: 3/03/11

Start Qty: 1.00

Required Qty: 1.00

MS21042L6 Purchased No 260 Each 274.0000 6 6



Nut

Location

Loc Qty

Loc Code

ST300

274

111578

4

114495

1

115300

19

116102

50

116373

100

116548

100

AN960JD616 NAS1149D0663J Purchased No 260 Each 0.0000 18 18



Washer

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTROM/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

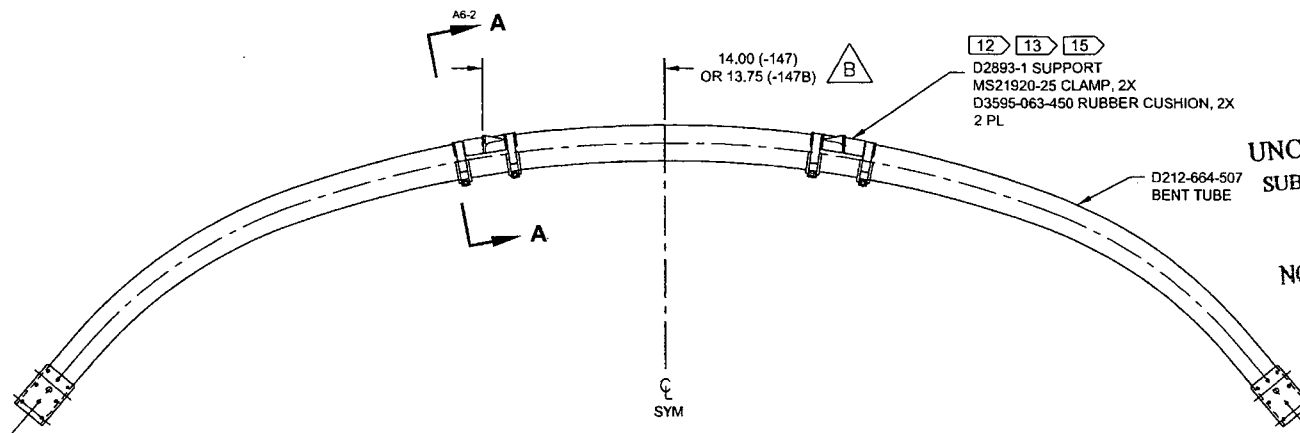
GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%
BASED ON O.D. EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

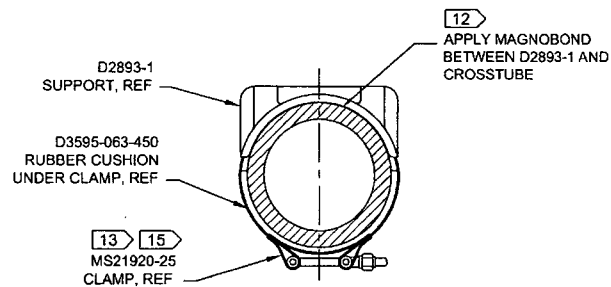
SHOP COPY
RETURN TO
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UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 66481
021102115

RELEASED
2009-10-29

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>9</u>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<u>9</u>	DRAWING NO.	REV. B
MFG. APPR.	<u>15</u>	D212-664-147	SHEET 1 OF 4
APPROVED	<u>12</u>	TITLE	SCALE
DE APPR.	<u>14</u>	CROSSTUBE (205/212/412 LOW FWD)	NTS
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D212-664-147/-147B
ASSEMBLY DETAIL



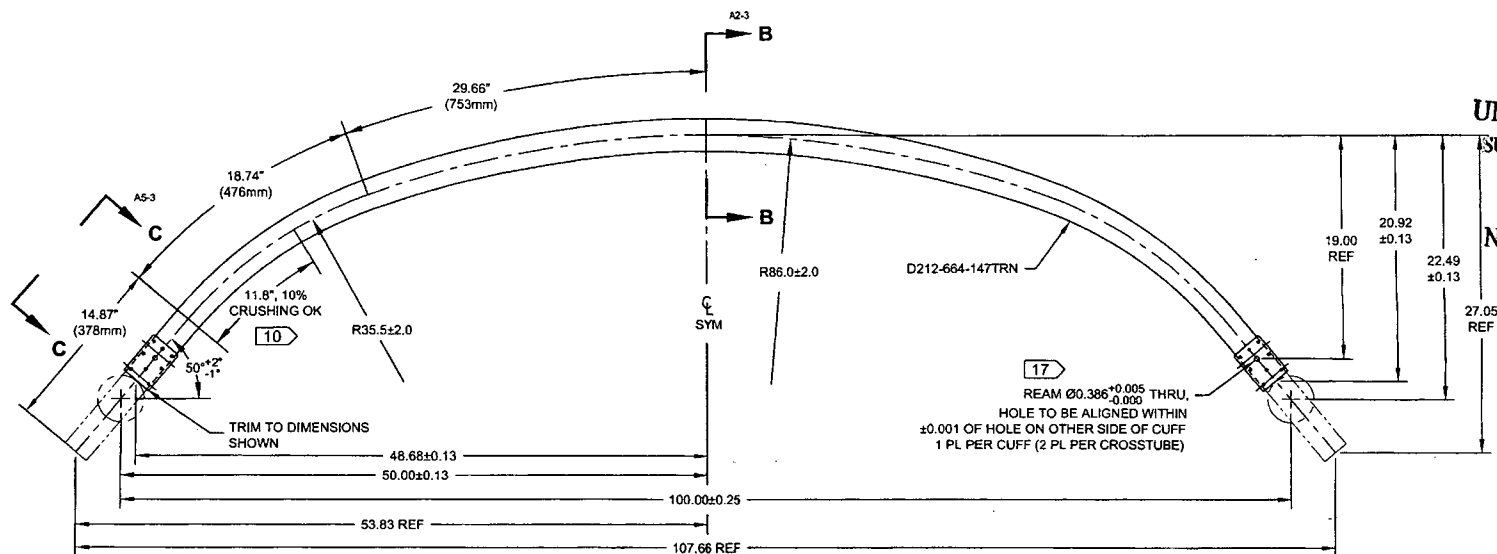
SECTION A-A D5-2
SCALE 4X

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NO. 66481

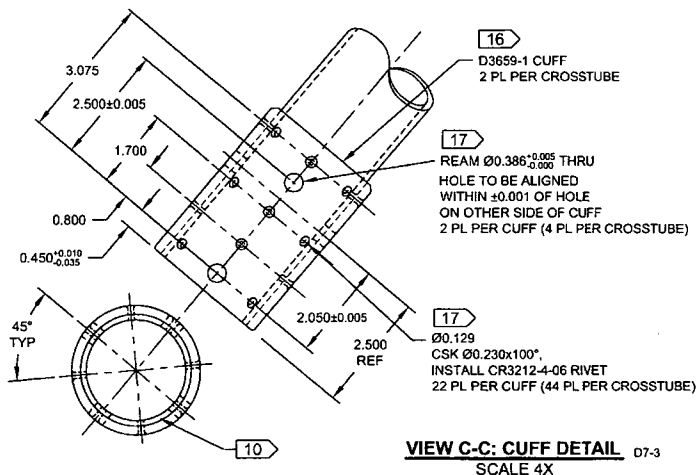
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2009-10-29

DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. B
MFG. APPR.	97	D212-664-147	SHEET 2 OF 4
APPROVED	97	TITLE	SCALE
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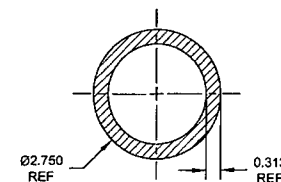
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D212-664-507
BENDING AND DRILLING DETAIL 10 B



VIEW C-C: CUFF DETAIL 07-3
SCALE 4X



SECTION B-B 05-3
SCALE 4X

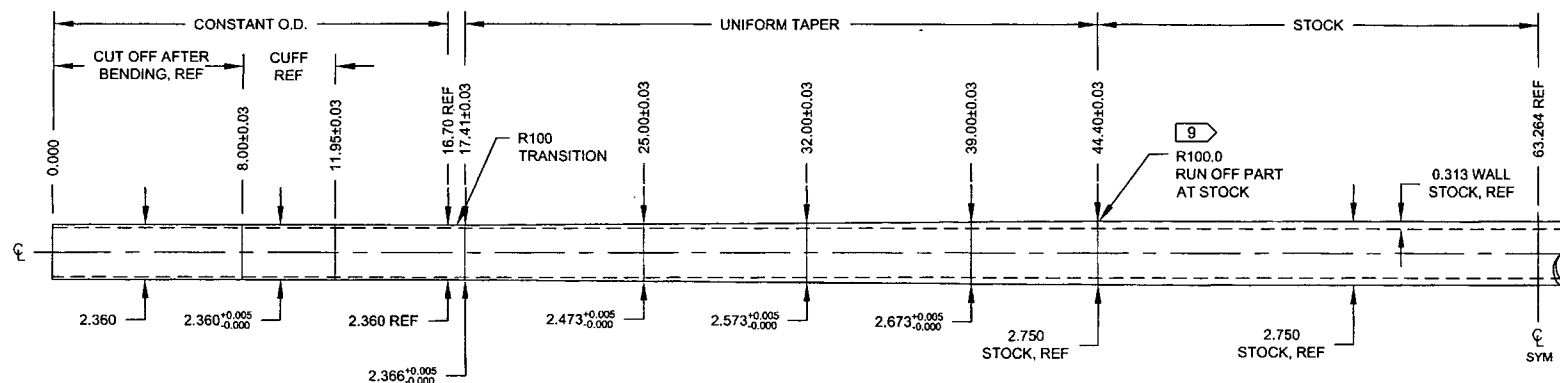
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DESIGN	9P	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9P	DRAWING NO.	REV. B
MFG. APPR.	18	D212-664-147	SHEET 3 OF 4
APPROVED	18	TITLE	SCALE
DE APPR.	18	CROSSTUBE (205/212/412 LOW FWD)	NTS
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D212-664-147TRN
TURNING DETAIL

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2009-10-29
MD

DESIGN	<i>RF</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>RF</i>	DRAWING NO.	REV. B
MFG. APPR.	<i>RF</i>	D212-664-147	SHEET 4 OF 4
APPROVED	<i>RF</i>	TITLE	SCALE
DE APPR.	<i>RF</i>	CROSSTUBE (205/212/412 LOW FWD)	NTS
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DART AEROSPACE LTD	Work Order: 66481
Description: Crosstube Assembly (205/212/412 Low Fwd)	Part Number: D212-664-147
Inspection Dwg: D212-664-147 Rev: B	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

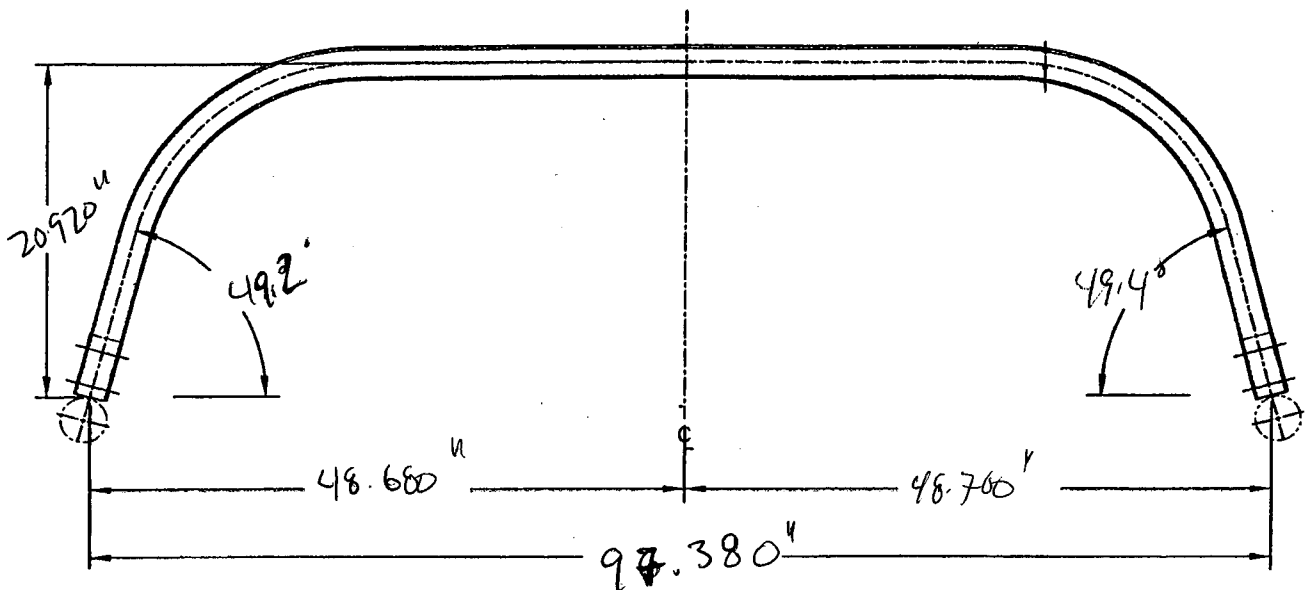
Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.313	+/-0.010					
	2.360	+0.005/-0.000					
	2.360	+0.005/-0.000					
	2.366	+0.005/-0.000					
	2.473	+0.005/-0.000					
	2.573	+0.005/-0.000					
	2.673	+0.005/-0.000					
	2.750	+0.005/-0.000					
	2.750	+0.005/-0.000					
SIDE B	0.313	+/-0.010					
	2.360	+0.005/-0.000					
	2.360	+0.005/-0.000					
	2.366	+0.005/-0.000					
	2.473	+0.005/-0.000					
	2.573	+0.005/-0.000					
	2.673	+0.005/-0.000					
	2.750	+0.005/-0.000					
	2.750	+0.005/-0.000					
	0.126.528	+/-0.020					

Measured by:		Audited by:		Prototype Approval:	N/A
Date:		Date:		Date:	N/A

Rev	Date	Change	Revised by	Approved
A	08.11.07	New Issue (P/O D212-664-107)	KJ/EC	
B	10.02.02	Dimension 126.528 was 126.53	KJ	

DART AEROSPACE LTD		Work Order:	66481
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147 Rev: B		Page 1 of 1	

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	8
Date	10/03/11

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	



LIQUID PENETRANT TEST REPORT

P- 05497

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/NO.

WORK LOCATION

ACCEPTANCE STD.

PAGE

TIME

AM

PM

JOB DESCRIPTION

PROCEDURE NO. LT-002 REV./DATE

TECHNIQUE NO. LT-002

REV./DATE

ART NO.

MATERIAL

THICKNESS

SCOPE

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
AMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	13798	OUTPUT > 1000 μ W/cm ²
ENETRANT	ZL-67	MINIMUM DWELL TIME	10 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
ENETRANT REMOVER	H ₂ O	MINIMUM DRY TIME	> 10 MIN.	OTHER	
DEVELOPER	SKD-52	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY				

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☒ IMPERIAL)

- 1 CRISTUBE W.O.I.D 66519 ✓
- 2 CRISTUBE W.O.I.D 66520 ✓
- 3 CRISTUBE W.O.I.D 66481 ✓
- 4 CRISTUBE W.O.I.D 65981 ✓
- 5 CRISTUBE W.O.I.D 65982 ✓

- 1 ITEM ID: D212-664-101 (FWD) -1
- 2 ITEM ID: D212-664-101 (FWD) -2
- 3 ITEM ID: D212-664-107 (KROST FWD) -3
- 4 ITEM ID: D212-664-101 (FWD) -4
- 5 ITEM ID: D212-664-101 (FWD) -5

NO UNACCEPTABLE INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

CGSB LEVEL

SNT LEVEL

CGSB REG. NO.

CGSB LEVEL

SNT LEVEL

CGSB REG. NO.

DTR # 244630

REPORT

REVIEWED BY:

NAME

INITIALS

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: March 18, 2011 10:12 AM
To: 'Chris Provencal'
Cc: 'Mike Petsche'; 'Bill Beckett'; 'Linda Lacelle'
Subject: RE: NCR D212-664-107

Hi Chris ... I don't think we should take any chances ... I agree that we should scrap the tube.

David

From: Chris Provencal [mailto:cprovencal@dartaero.com]
Sent: Thursday, March 17, 2011 12:04 PM
To: David Shepherd
Cc: Mike Petsche
Subject: NCR D212-664-107

David,

Qty(1) D212-664-107 xtube. While moving stuff for HAI, the xtube was knocked off its trolley and fell on the floor. The tube has been stripped and there's a small dent where it must have contacted an edge.

Can't measure the depth, but it appears to be on the order of 0.010". The dent is 0.14" long, located 21" from the tube center, and 0.25" above the neutral axis.

The dent is likely within the allowable repair of the ICA (0.015"). However considering it's a dent from dropping the tube, there's likely a kinetic energy involved from the mass of the tube hitting whatever it contacted, so the tube would have been stressed a lot deeper than the 0.010".

-Chris